

What is claimed is:

1 1. A digital broadcasting apparatus which achieves simulated  
2 interaction using a digital broadcast, the digital  
3 broadcasting apparatus comprising:

4 image information storage means for storing a  
5 plurality of sets of image data, each of which has an image  
6 data identifier;

7 , control information storage means for storing a  
8 plurality of sets of control information, each of which has  
9 a control information identifier, and each of which includes  
10 link destination information that shows a set of image data  
11 and a set of control information for a link destination for  
12 a corresponding set of image data; and

13 transmission means for repeatedly transmitting a  
14 plurality of sets of the image data and a plurality of sets  
15 of the control information.

1 2. A digital broadcasting apparatus which achieves simulated  
2 interaction using a digital broadcast, the digital  
3 broadcasting apparatus comprising:

4 image information storage means for storing a  
5 plurality of sets of image data, each of which has an image  
6 data identifier;

7 control information storage means for storing a  
8 plurality of sets of control information, each of which has  
9 a control information identifier, and each of which includes

10 link destination information that shows a set of image data  
11 and a set of control information for a link destination for  
12 a corresponding set of image data; and  
13 multiplexing transmission means for repeatedly  
14 transmitting a plurality of sets of the image data and a  
15 plurality of sets of the control information as a  
16 multiplexed stream.

1 3. The digital broadcasting apparatus of Claim 2, further  
2 comprising correspondence information storage means for  
3 storing correspondence information showing correspondence  
4 between the sets of image data and the sets of control  
5 information,

6 wherein the multiplexing transmission means includes:  
7 a retrieval unit for retrieving a set of image data  
8 and a corresponding set of control information shown in the  
9 correspondence information; and

10 a multiplexing unit for successively multiplexing  
11 image data and control information retrieved by the  
12 retrieval unit.

1 4. The digital broadcasting apparatus of Claim 3, wherein  
2 the link destination information shows a combination of an  
3 image data identifier of the set of the image data for the  
4 link destination and a control information identifier of a  
5 corresponding set of control information for the link

6 destination.

1 5. The digital broadcasting apparatus of Claim 4, wherein  
2 the multiplexing unit, when multiplexing a set of image data  
3 and a set of control information, assigns and writes first  
4 image data identification information into the set of image  
5 data and control information identification information into  
6 the set of control information.

1 6. The digital broadcasting apparatus of Claim 2, wherein at  
2 least one set of control information includes supplementary  
3 image information which is used to select a set of image  
4 data for a link destination indicated by the link  
5 destination information.

1 7. The digital broadcasting apparatus of Claim 2, wherein at  
2 least one set of control information includes script  
3 information for supporting an interactive function performed  
4 by a reception apparatus which receives the digital  
5 broadcast.

1 8. The digital broadcasting apparatus of Claim 2, further  
2 comprising entry information storage means for storing entry  
3 information which shows a combination of a set of image data  
4 and a set of control information which are to be reproduced  
5 first for a program,

6 wherein the multiplexing transmission means repeatedly  
7 transmits the entry information.

1 9. A digital broadcasting apparatus which achieves simulated  
2 interaction using a digital broadcast, the digital  
3 broadcasting apparatus comprising:

4 image information storage means for storing a  
5 plurality of sets of image data, each of which has an image  
6 data identifier;

7 control information storage means for storing a  
8 plurality of sets of control information, each of which has  
9 a control information identifier, and each of which includes  
10 link destination information that shows a set of image data  
11 and a set of control information for a link destination for  
12 a corresponding set of image data, the link destination  
13 information showing a combination of an image data  
14 identifier of the set of the image data for the link  
15 destination and a control information identifier for the set  
16 of the control information;

17 correspondence information storage means for storing  
18 correspondence information showing correspondence between  
19 the sets of image data and the sets of control information;  
20 and

21 multiplexing transmission means for repeatedly  
22 transmitting a plurality of sets of the image data and a  
23 plurality of the control information as a multiplexed

24 stream,

25 wherein the multiplexing transmission means includes:

26 a retrieval unit for retrieving a set of image data

27 and a corresponding set of control information shown in the

28 correspondence information;

29 a multiplexing unit for successively multiplexing

30 image data and control information retrieved by the

31 retrieval unit, in doing so assigning and writing first

32 image data identification information into the set of image

33 data and control information identification information into

34 the set of control information,

35 an image correspondence table generation unit for

36 generating an image correspondence table for each set of

37 image data, each image correspondence table being given

38 identification information found from the image data

39 identifier of the corresponding set of image data, each

40 image correspondence table including second image data

41 identification information specifying a corresponding set of

42 image data; and

43 an image correspondence table multiplexing unit for

44 reading an image correspondence table corresponding to a set

45 of image data and multiplexing the image correspondence

46 table such that the image correspondence table will be

47 transmitted by the multiplexing transmission means at a time

48 which precedes a transmission of the corresponding set of

49 image data by at least a predetermined time period, the

50 predetermined time period being defined as a time period  
51 which allows a digital broadcast reception apparatus which  
52 receives the digital broadcast to obtain the second image  
53 data identification information specifying a set of image  
54 data before starting to extract the corresponding set of  
55 image data.

1 10. The digital broadcasting apparatus of Claim 9, wherein  
2 the multiplexing transmission means further includes:  
3 a retrieval control unit for controlling the retrieval  
4 unit to retrieve at least one set of image data which has  
5 first image data identification information that differs  
6 from the image data specified by second image data  
7 identification information included in the image  
8 correspondence table, during a time period between a  
9 multiplexing of the image correspondence table into the  
10 multiplexed stream by the image correspondence table  
11 multiplexing unit and a multiplexing of the set of image  
12 data corresponding to the image correspondence table.

1 11. The digital broadcasting apparatus of Claim 10, wherein  
2 the multiplexing unit includes a null data generation unit  
3 for generating, when a number of sets of image data stored  
4 in the image information storage means is less than a  
5 predetermined number, a number of sets of null data to make  
6 up the predetermined number, wherein the multiplexing unit

7 successively multiplexes the sets of null data generated by  
8 the null data generation unit after a final set of image  
9 data and a final set of control information have been read  
10 by the retrieval unit.

1 12. The digital broadcasting apparatus of Claim 9, wherein  
2 the multiplexing unit further includes an area assigning  
3 unit for assigning, when a set of image data and a set of  
4 control information are multiplexed, a bit rate to the set  
5 of image data and to the corresponding set of control  
6 information, each bit rate being determined in accordance  
7 with a ratio of a data amount of each set of image data to  
8 an information amount of the corresponding set of control  
9 information,

10 wherein the multiplexing unit multiplexes the set of  
11 image data and the set of control information using the  
12 respective bit rates assigned by the area assigning unit.

1 13. The digital broadcasting apparatus of Claim 12, wherein  
2 the multiplexing unit further includes a multiplexing start  
3 position calculation unit for calculating multiplexing start  
4 positions for when an image correspondence table, a set of  
5 image data, and a set of control information are  
6 multiplexed, using a predetermined equation,

7 the image correspondence table multiplexing unit  
8 multiplexing an image correspondence table starting at the

9 multiplexing start position calculated by the multiplexing  
10 start position calculation unit, and  
11 the multiplexing unit multiplexing a set of image data  
12 and a set of control information at the respective  
13 multiplexing start positions calculated by the multiplexing  
14 start position calculation unit.

1 14. The digital broadcasting apparatus of Claim 9, wherein  
2 the first image data identification information and the  
3 second image data identification information are the same.

1 15. The digital broadcasting apparatus of Claim 9, wherein  
2 the first image data identification information and the  
3 second image data identification information are  
4 combinations of a stream identifier ("stream\_id") and a  
5 packet identifier ("PID") in accordance with MPEG2 (Moving  
6 Pictures Experts Group2) standard.

1 16. The digital broadcasting apparatus of Claim 9, wherein  
2 the first image data identification information is a  
3 combination of a stream identifier ("stream\_id") and a  
4 packet identifier ("PID") in accordance with MPEG2 (Moving  
5 Pictures Experts Group2) standard, and the second image data  
6 identification information is a combination of a stream  
7 identifier in accordance with MPEG2 (Moving Pictures Experts  
8 Group2) standard and a component tag ("component\_tag") in



9 accordance with DVB (Digital Video Broadcasting) standard,  
10 wherein the multiplexing transmission means repeatedly  
11 transmits a correspondence table for the packet identifier  
12 and the component tag.

1 17. The digital broadcasting apparatus of Claim 9, wherein  
2 the multiplexing transmission means further includes an  
3 image data identifier appending unit for writing, when a set  
4 of image data retrieved by the retrieval unit is  
5 multiplexed, an image data identifier into a private area of  
6 the corresponding set of image data.

1 18. The digital broadcasting apparatus of Claim 9, wherein  
2 the image correspondence table multiplexing unit, after  
3 multiplexing an image correspondence table, multiplexes the  
4 same image correspondence table a plurality of times before  
5 a set of image data which corresponds to the image  
6 correspondence table is multiplexed.

1 19. A digital broadcasting apparatus which achieves  
2 simulated interaction using a digital broadcast, the digital  
3 broadcasting apparatus comprising:

4 image information storage means for storing a  
5 plurality of sets of image data, each of which has an image  
6 data identifier;

7 audio information storage means for storing a

plurality of sets of audio data, each of which has an audio data identifier;

control information storage means for storing a plurality of sets of control information, each of which has a control information identifier, and each of which includes link destination information that shows a set of image data, a set of audio data, and a set of control information for a link destination for the corresponding set of image data; and

multiplexing transmission means for repeatedly transmitting a plurality of sets of the image data, a plurality of sets of audio data, and a plurality of the control information as a multiplexed stream.

20. The digital broadcasting apparatus of Claim 19, further comprising:

correspondence information storage means for storing correspondence information showing correspondence between the sets of image data, the sets of audio data, and the sets of control information,

wherein the multiplexing transmission means includes:

a retrieval unit for retrieving a set of image data and a corresponding set of audio data and a corresponding set of control information shown in the correspondence information; and

a multiplexing unit for successively multiplexing

13 image data, audio data and control information retrieved by  
14 the retrieval unit.

1 21. The digital broadcasting apparatus of Claim 20, wherein  
2 the link destination information shows a combination of an  
3 image data identifier for the set of image data of a link  
4 destination, an audio data identifier for the set of audio  
5 data of the link destination, and a control information  
6 identifier for the control information of the link  
7 destination.

1 22. The digital broadcasting apparatus of Claim 4, wherein  
2 the multiplexing unit, when multiplexing a set of image  
3 data, a set of audio data, and a set of control information,  
4 assigns and writes first image data identification  
5 information into the set of image data, first audio data  
6 identification information into the set of audio data, and  
7 control information identification information into the set  
8 of control information.

1 23. The digital broadcasting apparatus of Claim 22, wherein  
2 the multiplexing transmission means further includes:  
3 an image correspondence table generation unit for  
4 generating an image correspondence table for each set of  
5 image data, each image correspondence table being given  
6 identification information found from the image data

7 identifier of the corresponding set of image data, each  
8 image correspondence table including second image data  
9 identification information specifying a corresponding set of  
10 image data; and

11 an audio correspondence table generation unit for  
12 generating an audio correspondence table for each set of  
13 audio data, each audio correspondence table being given  
14 identification information found from the audio data  
15 identifier of the corresponding set of audio data, each  
16 audio correspondence table including second audio data  
17 identification information specifying a corresponding set of  
18 audio data;

19 an image correspondence table multiplexing unit for  
20 reading an image correspondence table corresponding to a set  
21 of image data and multiplexing the image correspondence  
22 table such that the image correspondence table will be  
23 transmitted by the multiplexing transmission means at a time  
24 which precedes a transmission of the corresponding set of  
25 image data by at least a predetermined time period, the  
26 predetermined time period being defined as a time period  
27 which allows a digital broadcast reception apparatus which  
28 receives the digital broadcast to obtain the second image  
29 data identification information specifying a set of image  
30 data before starting to extract the image data; and

31 an audio correspondence table multiplexing unit for  
32 reading an audio correspondence table corresponding to a set

33 of audio data and multiplexing the audio correspondence  
34 table such that the audio correspondence table will be  
35 transmitted by the multiplexing transmission means at a time  
36 which precedes a transmission of the corresponding set of  
37 audio data by at least a predetermined time period, the  
38 predetermined time period being defined as a time period  
39 which allows a digital broadcast reception apparatus which  
40 receives the digital broadcast to obtain the second audio  
41 identification information specifying a set of audio data  
42 before starting to extract the audio data.

1 24. A digital broadcasting apparatus which achieves  
2 simulated interaction using a digital broadcast, the digital  
3 broadcasting apparatus comprising:

4 image information storage means for storing a  
5 plurality of sets of image data, each of which has an image  
6 data identifier;

7 control information storage means for storing a  
8 plurality of sets of control information, each of which has  
9 a control information identifier, and each of which includes  
10 link destination information that shows a set of image data  
11 and a set of control information for a link destination for  
12 the sets of image data, the link destination information  
13 showing a combination of an image data identifier of the set  
14 of the image data for the link destination and a control  
15 information identifier for the set of control information;

16 correspondence information storage means for storing  
17 correspondence information showing correspondence between  
18 the sets of image data and the sets of control information;  
19 and  
20 multiplexing transmission means for repeatedly  
21 transmitting a plurality of sets of the image data and a  
22 plurality of the control information as a multiplexed  
23 stream,  
24 wherein the multiplexing transmission means includes:  
25 a retrieval unit for retrieving a plurality of sets of  
26 image data and corresponding sets of control information  
27 shown in the correspondence information;  
28 a multiplexing unit for successively multiplexing  
29 image data and control information retrieved by the  
30 retrieval unit, in doing so assigning and writing first  
31 image data identification information into the set of image  
32 data and control information identification information into  
33 the set of control information;  
34 an image correspondence table generation unit for  
35 generating an image correspondence table for each set of  
36 image data, each correspondence table having identification  
37 information found from the image data identifier of the  
38 corresponding set of image data, each image correspondence  
39 table including second image data identification information  
40 specifying a corresponding set of image data and  
41 reproduction time information for the corresponding set of

42 image data; and  
43 an image correspondence table multiplexing unit for  
44 reading an image correspondence table corresponding to a set  
45 of image data and multiplexing the image correspondence  
46 table such that the image correspondence table will be  
47 transmitted by the multiplexing transmission means at a time  
48 which precedes a transmission of the corresponding set of  
49 image data by at least a predetermined time period, the  
50 predetermined time period being defined as a time period  
51 which allows a digital broadcast reception apparatus which  
52 receives the digital broadcast to obtain the second image  
53 data identification information specifying a set of image  
54 data before starting to extract the image data.

1 25. The digital broadcasting apparatus of Claim 24, wherein  
2 the image correspondence table generation unit includes:

3 a reproduction time calculation unit for calculating  
4 reproduction time information at which a set of image data  
5 corresponding to an image correspondence table is to be  
6 reproduced, in accordance with a predetermined equation; and

7 a reproduction time writing unit for writing the  
8 reproduction time information calculated by the reproduction  
9 time calculation unit into the image correspondence table.

1 26. A digital broadcasting apparatus which achieves  
2 simulated interaction using a digital broadcast, the digital

3 broadcasting apparatus comprising:

4 image information storage means for storing a  
5 plurality of sets of image data, each of which has an image  
6 data identifier;

7 control information storage means for storing a  
8 plurality of sets of control information, each of which has  
9 a control information identifier, and each of which includes  
10 link destination information that shows a set of image data  
11 and a set of control information for a link destination for  
12 the sets of image data, the link destination information  
13 showing a combination of an image data identifier of the set  
14 of the image data for the link destination and a control  
15 information identifier for the control information;

16 correspondence information storage means for storing  
17 correspondence information showing correspondence between  
18 the sets of image data and the sets of control information;  
19 and

20 multiplexing transmission means for repeatedly  
21 transmitting a plurality of sets of the image data and a  
22 plurality of the control information as a multiplexed  
23 stream,

24 wherein the multiplexing transmission means includes:  
25 a retrieval unit for retrieving a plurality of sets of  
26 image data and corresponding sets of control information  
27 shown in the correspondence information;

28 a multiplexing unit for successively multiplexing



29 image data and control information retrieved by the  
30 retrieval unit, in doing so assigning and writing first  
31 image data identification information into the set of image  
32 data and control information identification information into  
33 the set of control information;

34 a module information generation unit for generating a  
35 set of module information for a plurality of sets of image  
36 data, the module information including second image data  
37 identification information for identifying each set of image  
38 data in the plurality of sets of image data; and

39 a module information multiplexing unit for reading  
40 module information generated by the module information  
41 generation means and multiplexing the module information  
42 such that the module information will be transmitted by the  
43 multiplexing transmission means at a time which precedes a  
44 transmission of the sets of image data, which are identified  
45 by the second image data identification information in the  
46 module information, by at least a predetermined time period,  
47 the predetermined time period being defined as a time period  
48 which allows a digital broadcast reception apparatus which  
49 receives the digital broadcast to obtain the second image  
50 data identification information specifying a set of image  
51 data before starting to extract the corresponding set of  
52 image data.

1 27. A digital broadcast reception apparatus for receiving a

repeatedly transmitted digital broadcast of a plurality of sets of image data and sets of control information which correspond to the sets of image data, each set of control information including link destination information showing a set of image data which is a link destination for a link attached to a set of image data corresponding to the set of control information,

the digital broadcast reception apparatus comprising:  
reception means for receiving the digital broadcast;  
extraction means for extracting one set of image data and a corresponding set of control information from the received digital broadcast;

storage means for storing the extracted set of control information;

reproduction means for reproducing the extracted set of image data;

operation means for receiving a user selection operation of link destination information included in the set of control information; and

extraction control means for controlling the extraction means to extract a set of image data and a corresponding set of control information which are indicated by the link destination information selected by the user selection operation.

28. The digital broadcast reception apparatus of Claim 27,

2 wherein each set of image data is appended with first image  
3 data identification information and each set of control  
4 information is appended with control information  
5 identification information,

6 the operation means including an indication reception  
7 unit for receiving an operation indicating a switching from  
8 a currently displayed set of image data to a set of image  
9 data for a link destination,

10 the extraction control means reading the link  
11 destination information in the set of control information  
12 stored in the storage means, and setting an extraction  
13 condition for the extraction means based on an image data  
14 identifier for a set of image data of the link destination  
15 to which switching has been indicated by the indication  
16 reception unit and a control information identifier for a  
17 corresponding set of control information,

18 wherein each set of control information includes an  
19 image data identifier for identifying a set of image data  
20 for a link destination and a control information identifier  
21 for identifying a set of control information for the link  
22 destination as the link destination information,

23 and wherein the extraction means extracts a set of  
24 image data and a set of control information according to the  
25 extraction condition set by the extraction control means.

1 29. The digital broadcast reception means of Claim 28,

wherein the plurality of sets of image data and plurality of sets of corresponding control information are transmitted having been multiplexed into a multiplexed stream,

wherein the reproduction means includes a supplementary image reproduction unit for combining supplementary image information included in the control information stored in the storage means with a set of image data and reproducing the combined image, wherein the supplementary image information includes a supplementary image which is used to select a switching of image data from a present set of image data to a link destination set of image data.

30. The digital broadcast reception means of Claim 28, wherein the plurality of sets of image data and plurality of sets of corresponding control information are transmitted having been multiplexed into a multiplexed stream, and each set of control information includes script information for supporting an interactive function,

wherein the reproduction means includes:  
a script information interpreting unit for interpreting script information; and

a script execution unit for executing scripts in the script information, in accordance with an interpretation of the script information interpreting unit.

1 31. The digital broadcast reception apparatus of Claim 28,  
2 wherein the plurality of sets of image data and  
3 corresponding sets of control information are transmitted  
4 having been multiplexed into a multiplexed stream,  
5 wherein entry information, showing an image data  
6 identifier of a set of image data to be reproduced first  
7 when the reproduction of the multiplexed stream is commenced  
8 and a control information identifier of a set of control  
9 information corresponding to the set of image data, is  
10 multiplexed into the multiplexed stream,  
11 wherein the extraction means includes an entry  
12 information extraction unit for receiving an indication from  
13 the extraction control means and extracting the entry  
14 information,  
15 wherein the storage means includes an entry  
16 information storage unit for storing the entry information  
17 extracted by the entry information extraction unit, and  
18 wherein the extraction control means sets the  
19 extraction condition in the extraction means based on the  
20 image data identifier and the control information identifier  
21 written in the entry information.

1 32. A digital broadcast reception apparatus for receiving a  
2 repeatedly transmitted digital broadcast of a plurality of  
3 sets of image data and sets of control information which  
4 correspond to the sets of image data, each set of control

5 information including link destination information showing a  
6 set of image data which is a link destination for a link  
7 attached to a set of image data corresponding to the set of  
8 control information, each set of image data having first  
9 image data identification information, each set of control  
10 information having control information identification  
11 information, the plurality of sets of image data and  
12 corresponding sets of control information being multiplexed  
13 into a multiplexed stream and transmitted, the multiplexed  
14 stream including an image correspondence table for each set  
15 of image data, each image correspondence table including  
16 second image data identification information specifying a  
17 corresponding set of image data, each image correspondence  
18 table having identification information found from the image  
19 data identifier of the corresponding set of image data, the  
20 image correspondence tables being repeatedly transmitted in  
21 the same way as the sets of image data,

22 the digital broadcast reception apparatus comprising:  
23 reception means for receiving the digital broadcast;  
24 extraction means for extracting one set of image data  
25 and a corresponding set of control information from the  
26 received digital broadcast,

27 the extraction means including an image correspondence  
28 table extraction unit for extracting an image correspondence  
29 table with image correspondence table identification  
30 information which matches a set extraction condition;

31 storage means for storing the extracted set of control  
32 information,  
33 the storage means including an image correspondence  
34 table storage unit for storing the extracted image  
35 correspondence table;  
36 reproduction means for reproducing an extracted set of  
37 image data;  
38 operation means for receiving user selection  
39 operations for link destination information included in sets  
40 of control information,  
41 the operation means including an indication receiving  
42 unit for receiving an indication for a switching from a set  
43 of image data presently being reproduced to a set of image  
44 data for a link destination; and  
45 an extraction control means for controlling the  
46 extraction means to extract a set of image data and a set of  
47 corresponding control information indicated by the link  
48 destination information included in the control information,  
49 for reading the link destination information in the set of  
50 control information stored in the storage means, and for  
51 setting an extraction condition in the extraction means  
52 based on an image data identifier of a set of image data of  
53 a link destination to which switching has been indicated by  
54 the indication receiving unit and a control information  
55 identifier of a corresponding set of control information,  
56 wherein each set of control information includes an

57 image data identifier of a set of image data of a link  
58 destination and a control information identifier of a  
59 corresponding set of control information as the link  
60 destination information,

61 wherein the extraction means extracts a set of image  
62 data and a set of control information indicated by the  
63 extraction condition in the extraction means, and

64 , wherein the extraction control means includes an  
65 extraction condition setting unit for setting image  
66 correspondence table identification information found from  
67 an image data identifier of a set of image data of the link  
68 destination as the extraction condition.

1 33. The digital broadcast reception apparatus of Claim 32,  
2 wherein the extraction control means further includes:

3 an image data extraction control unit for reading the  
4 second image data identification information written in the  
5 image correspondence table stored in the image  
6 correspondence table storage unit, and setting the  
7 extraction condition in the extraction means using the read  
8 second image data identification information;

9 and wherein the extraction means further includes:

10 an image data extraction unit for extracting a set of  
11 image data which matches the extraction condition set by the  
12 image data extraction control unit.



1 34. The digital broadcast reception apparatus of Claim 33,  
2 wherein the sets of image data are such that identical first  
3 image data identification information have been repeatedly  
4 assigned to different sets of image data,

5 and wherein the reproduction means includes:

6 an identifier extraction unit for extracting an image  
7 data identifier included in the image data extracted by the  
8 image data extraction unit, the image data identifier having  
9 been written into a private area of the image data,

10 wherein the extraction control means further includes:

11 an image data judgement unit for judging whether the  
12 image data identifier of the set of image data extracted by  
13 the image data extraction unit matches the image data  
14 identifier of the set of image data for the link destination  
15 in the read link destination information;

16 a reproduction termination indicating unit for  
17 sending, when the image data judgement unit judges that the  
18 identifiers do not match, the reproduction means an  
19 indication to terminate reproduction, with the reproduction  
20 means terminating the reproduction on receiving the  
21 indication; and

22 an image correspondence table extraction indicating  
23 unit for indicating an extraction of an image correspondence  
24 table to the image correspondence table extraction unit when  
25 the reproduction termination indicating unit has sent a  
26 reproduction termination indication.

35. The digital broadcasting reception apparatus of Claim 34, wherein the extraction control means further includes an extraction termination indicating unit for indicating a termination of an extraction of a set of image data by the image data extraction unit when the image data judgement unit judges that the identifiers match, with the image data extraction unit terminating the extraction on receiving the indication.

36. The digital broadcast reception apparatus of Claim 33, wherein each image correspondence table includes a reproduction start time for the corresponding set of image data,

wherein the reproduction means further includes:

a clock unit for measuring time,

wherein the reproduction means decodes and reproduces the extracted set of image data, in doing so notifying the extraction control means of a completion of decoding on completing a decoding of one set of image data,

wherein the extraction control means further includes:

a reproduction start time judgement unit for judging whether a notification of the completion of decoding has been received from the reproduction means before the reproduction start time of the set of image data written in the image correspondence table; and

17 an extraction indicating unit for indicating a  
18 termination of an extraction of image data to the image data  
19 extraction unit when the reproduction start time judgement  
20 unit judges that no notification has been received, and for  
21 indicating an extraction of an image correspondence table to  
22 the image correspondence table extraction unit.

1 37. The digital broadcast reception apparatus of Claim 33,  
2 wherein the first image data identification  
3 information is a combination of a stream identifier  
4 ("stream\_id") and a packet identifier ("packet\_id")  
5 according to MPEG2 (Moving Pictures Experts Group2)  
6 standard,

7 wherein the second image data identification  
8 information is a combination of a stream identifier in  
9 accordance with MPEG2 standard and a component tag  
10 ("component\_tag") in accordance with DVB (Digital Video  
11 Broadcasting) standard, with a correspondence table for the  
12 component tags and packet identifiers being multiplexed into  
13 the multiplexed stream and repeatedly transmitted,

14 wherein the extraction means extracts the  
15 correspondence table and the extraction control means refers  
16 to the correspondence table, converts the second image data  
17 identification information to the first image data  
18 identification information, and sets the extraction  
19 condition in the image data extraction unit.

1 38. The digital broadcasting reception apparatus of Claim  
2 37, wherein the control information identification  
3 information is a table identifier extension  
4 ("table\_id\_extension"), in accordance with MPEG2 standard,  
5 which has a same value as the control information  
6 identifier.

1 39. The digital broadcasting reception apparatus of Claim  
2 33, wherein the first image data identification information  
3 and the second image data identification information are  
4 identical, with the image data extraction control unit  
5 setting the read second image data identification  
6 information as the extraction condition in the extraction  
7 means.

1 40. The digital broadcasting reception apparatus of Claim  
2 33, wherein a reproduction end time of the corresponding set  
3 of image data is written into the image correspondence  
4 table,

5 wherein the reproduction means further includes a  
6 clock unit for measuring time,  
7 and wherein the extraction control means further  
8 includes:

9 an end time judgement unit for judging whether the  
10 reproduction end time written in the image correspondence

11 table has been reached; and  
12 an extraction termination indicating unit for  
13 indicating a termination of extraction of a set of image  
14 data to the image data extraction unit, when the end time  
15 judgement unit judges that the reproduction end time has  
16 been reached.

1 41. A digital broadcast reception apparatus for receiving a  
2 repeatedly transmitted digital broadcast of a plurality of  
3 sets of image data and sets of control information which  
4 correspond to the sets of image data, each set of control  
5 information including link destination information showing a  
6 set of image data which is a link destination for a link  
7 attached to a set of image data corresponding to the set of  
8 control information, each set of image data having first  
9 image data identification information, each set of control  
10 information having control information identification  
11 information, the plurality of sets of image data and  
12 corresponding sets of control information being multiplexed  
13 into a multiplexed stream and transmitted, the multiplexed  
14 stream including an image correspondence table for each set  
15 of image data, each image correspondence table including  
16 second image data identification information specifying a  
17 corresponding set of image data, each image correspondence  
18 table having identification information found from the image  
19 data identifier of the set of image data, the image

20 correspondence tables being repeatedly transmitted in the  
21 same way as the sets of image data,  
22 the digital broadcast reception apparatus comprising:  
23 reception means for receiving the digital broadcast;  
24 extraction means for extracting one set of image data  
25 and a corresponding set of control information from the  
26 received digital broadcast,  
27 the extraction means including an image correspondence  
28 table extraction unit for extracting an image correspondence  
29 table with image correspondence table identification  
30 information which matches a set extraction condition, a  
31 reproduction end time for a corresponding set of image data  
32 being written in each image correspondence table;  
33 an image data extraction unit for extracting sets of  
34 image data which match the set extraction condition from the  
35 multiplexed stream;  
36 storage means for storing the extracted set of control  
37 information,  
38 the storage means including an image correspondence  
39 table storage unit for storing the extracted image  
40 correspondence table;  
41 reproduction means for reproducing an extracted set of  
42 image data, wherein the reproduction means includes a clock  
43 unit for measuring time;  
44 operation means for receiving user selection  
45 operations for link destination information included in sets

46 of control information,  
47 the operation means including an indication receiving  
48 unit for receiving an indication for a switching from a set  
49 of image data presently being reproduced to a set of image  
50 data for a link destination; and  
51 an extraction control means for controlling the  
52 extraction means to extract a set of image data and a set of  
53 corresponding control information indicated by the link  
54 destination information included in the control information,  
55 for reading the link destination information in the set of  
56 control information stored in the storage means, and for  
57 setting an extraction condition in the extraction means  
58 based on an image data identifier of a set of image data of  
59 a link destination to which switching has been indicated by  
60 the indication receiving unit and a control information  
61 identifier of a corresponding set of control information,  
62 wherein each set of control information includes an  
63 image data identifier of a set of image data of a link  
64 destination and a control information identifier of a  
65 corresponding set of control information as the link  
66 destination information,  
67 wherein the extraction means extracts a set of image  
68 data and a set of control information indicated by the  
69 extraction condition in the extraction means, and  
70 wherein the extraction control means includes:  
71 an extraction condition setting unit for setting image

correspondence table identification information found from  
an image data identifier of a set of image data as the  
extraction condition;

an end time judgement unit for judging whether the  
reproduction end time of a set of image data which is  
written in the image correspondence table has been reached;  
and

an extraction state control unit for controlling the  
image data extraction unit to extract sets of image data  
which correspond to the extraction condition from the  
multiplexed stream, for a time period from a setting of the  
extraction condition by the extraction condition setting  
unit to a point when the end time judgement unit judges that  
the reproduction end time of the image data has been  
reached.

42. A digital broadcast reception apparatus for receiving a  
repeatedly transmitted digital broadcast of a plurality of  
sets of image data, a plurality of sets of audio data and  
sets of control information which each correspond to one set  
of image data and one set of audio data, each set of control  
information including link destination information showing a  
set of image data and a set of audio data of a link  
destination for a link attached to a set of image data  
corresponding to the set of control information,  
the digital broadcast reception apparatus comprising:



11 reception means for receiving the digital broadcast;  
12 extraction means for extracting one set of image data,  
13 one set of audio data and a corresponding set of control  
14 information from the received digital broadcast;  
15 storage means for storing the extracted set of control  
16 information;  
17 reproduction means for reproducing the extracted set  
18 of image data and extracted set of audio data;  
19 operation means for receiving a user selection  
20 operation of link destination information included in the  
21 set of control information; and  
22 extraction control means for controlling the  
23 extraction means to extract a set of image data, a set of  
24 audio data, and a corresponding set of control information  
25 which are indicated by the link destination information  
26 selected by the user selection operation.

1 43. The digital broadcast reception apparatus of Claim 42,  
2 wherein the operation means includes:  
3 an indication reception unit for receiving an  
4 operation indicating a switching from a currently displayed  
5 set of image data to a set of image data for a link  
6 destination,  
7 the extraction control means reading the link  
8 destination information in the set of control information  
9 stored in the storage means, and setting an extraction

10 condition for the extraction means based on an image data  
11 identifier for a set of image data of the link destination  
12 to which switching has been indicated by the indication  
13 reception unit, an audio data identifier for a corresponding  
14 set of audio data, and a control information identifier for  
15 a corresponding set of control information,

16 wherein each set of control information includes an  
17 image data identifier for identifying a set of image data  
18 for a link destination, an audio data identifier for  
19 identifying a set of audio data for a link destination, and  
20 a control information identifier for identifying a set of  
21 control information for the link destination as the link  
22 destination information,

23 and wherein the extraction means extracts a set of  
24 image data, a set of audio data, and a set of control  
25 information in accordance with the extraction condition set  
26 by the extraction control means.

1 44. The digital broadcast reception apparatus of Claim 43,  
2 wherein the multiplexed stream includes: an image  
3 correspondence table for each set of image data, each image  
4 correspondence table having image correspondence table  
5 identification information found from the image data  
6 identifier of the corresponding set of image data and each  
7 image correspondence table including second image data  
8 identification information for the corresponding set of

9 image data; and an audio correspondence table for each set  
10 of audio data, each audio correspondence table having audio  
11 correspondence table identification information found from  
12 the audio data identifier of the corresponding set of audio  
13 data and each audio correspondence table including second  
14 audio data identification information for the corresponding  
15 set of audio data, the image correspondence tables and audio  
16 correspondence tables being multiplexed into the multiplexed  
17 stream and repeatedly transmitted,

18 wherein the extraction control means includes:

19 an extraction condition setting unit for setting image  
20 correspondence table identification information found from  
21 an image data identifier of a set of image data and audio  
22 correspondence table identification information found from  
23 an audio data identifier of a set of audio data as the  
24 extraction condition,

25 wherein the extraction means includes:

26 an image correspondence table extraction unit for  
27 extracting an image correspondence table with image  
28 correspondence table identification information which  
29 matches the extraction condition set by the extraction  
30 condition setting unit from the multiplexed stream; and

31 an audio correspondence table extraction unit for  
32 extracting an audio correspondence table with audio  
33 correspondence table identification information which  
34 matches the extraction condition set by the extraction

35 condition setting unit from the multiplexed stream,  
36 and wherein the storage means includes:  
37 an image correspondence table storage unit for storing  
38 the image correspondence table extracted by the image  
39 correspondence table extraction unit; and  
40 an audio correspondence table storage unit for storing  
41 the audio correspondence table extracted by the audio  
42 correspondence table extraction unit.

12 45. The digital broadcasting reception apparatus of Claim  
13 44, wherein the extraction control means further includes:  
14 an image data extraction control unit for reading the  
15 second image data identification information written in the  
16 image correspondence table stored in the image  
17 correspondence table storage unit, and setting the  
18 extraction condition in the extraction means using the read  
19 second image data identification information;  
20 an audio data extraction control unit for reading the  
21 second audio data identification information written in the  
22 audio correspondence table stored in the audio  
23 correspondence table storage unit, and setting the  
24 extraction condition in the extraction means using the read  
25 second audio data identification information;  
26 and wherein the extraction means further includes:  
27 an image data extraction unit for extracting a set of  
28 image data which matches the extraction condition set by the

18 image data extraction control unit; and  
19 an image data extraction unit for extracting a set of  
20 image data which matches the extraction condition set by the  
21 image data extraction control unit.

1 46. The digital broadcast reception means of Claim 43,  
2 wherein the plurality of sets of image data and plurality of  
3 sets of corresponding control information are transmitted  
4 having been multiplexed into a multiplexed stream,  
5 wherein the reproduction means includes a  
6 supplementary image reproduction unit for combining  
7 supplementary image information included in the control  
8 information stored in the storage means with a set of image  
9 data and reproducing the combined image, wherein the  
10 supplementary image information includes a supplementary  
11 image which is used to select a switching of image data from  
12 a present set of image data to a link destination set of  
13 image data.

1 47. A digital broadcast reception apparatus for receiving a  
2 repeatedly transmitted digital broadcast of a plurality of  
3 sets of image data and sets of control information which  
4 each correspond to one set of image data, each set of  
5 control information including link destination information  
6 showing a set of image data of a link destination for a link  
7 attached to a set of image data corresponding to the set of

8 control information, each set of image data having first  
9 image data identification information, each set of control  
10 information having control information identification  
11 information, the plurality of sets of image data and  
12 corresponding sets of control information being multiplexed  
13 into a multiplexed stream and transmitted, a plurality of  
14 sets of module information, into which correspondence  
15 between a plurality of image data identifiers and a  
16 plurality of second image data identification information is  
17 written, being multiplexed into the multiplexed stream,  
18 the digital broadcast reception apparatus comprising:  
19 reception means for receiving the digital broadcast;  
20 extraction means for extracting one set of image data  
21 and a corresponding set of control information from the  
22 received digital broadcast,  
23 the extraction means including a module information  
24 extraction unit for extracting module information after an  
25 extraction condition for module information has been set;  
26 storage means for storing the extracted set of control  
27 information,  
28 the storage means including a module information  
29 storage unit for storing the extracted module information;  
30 reproduction means for reproducing an extracted set of  
31 image data;  
32 operation means for receiving user selection  
33 operations for link destination information included in sets

34 of control information,

35 the operation means including an indication receiving  
36 unit for receiving an indication for a switching from a set  
37 of image data presently being reproduced to a set of image  
38 data for a link destination; and

39 an extraction control means for controlling the  
40 extraction means to extract a set of image data and a set of  
41 corresponding control information indicated by the link  
42 destination information included in the control information,  
43 for reading the link destination information in the set of  
44 control information stored in the storage means, and for  
45 setting an extraction condition in the extraction means  
46 based on an image data identifier of a set of image data of  
47 a link destination to which switching has been indicated by  
48 the indication receiving unit and a control information  
49 identifier of a corresponding set of control information,

50 wherein each set of control information includes an  
51 image data identifier of a set of image data of a link  
52 destination and a control information identifier of a  
53 corresponding set of control information as the link  
54 destination information,

55 wherein the extraction means extracts a set of image  
56 data and a set of control information indicated by the  
57 extraction condition in the extraction means, and

58 wherein the extraction control means further includes  
59 an image data identifier judgement unit for judging

60 whether there is an image data identifier, which matches an  
61 image data identifier of the set of image data of the link  
62 destination read from the link destination information, in  
63 the module information stored in the module information  
64 storage unit,

65 an image data extraction control unit for reading,  
66 when the image data identifier judgement unit judges that a  
67 matching image data identifier is present, second image data  
68 identification information corresponding to the image data  
69 identifier from the module information and for setting an  
70 extraction condition for image data in the extraction means,  
71 using the second image data identification information, and

72 a module information re-extraction indicating unit for  
73 indicating an extraction of new module information to the  
74 module information extraction unit when the image data  
75 identifier judgement unit judges that a matching image data  
76 identifier is not present,

77 wherein on receiving an indication from the module  
78 information re-extraction indicating unit, the module  
79 information extraction unit extracts new module information,  
80 and updates the module information stored in the module  
81 information storage unit, at which point the image data  
82 identifier judgement unit performs a judgement for the  
83 updated module information.

1 48. A digital broadcasting system, which achieves simulated



interaction using a digital broadcast, including a digital  
broadcasting apparatus and a digital reception apparatus,  
wherein the digital broadcasting apparatus comprises:  
image information storage means for storing a  
plurality of sets of image data, each of which has an image  
data identifier;  
control information storage means for storing a  
plurality of sets of control information, each of which has  
a control information identifier, and each of which includes  
link destination information that shows a set of image data  
and a set of control information for a link destination for  
a corresponding set of image data; and  
transmission means for repeatedly transmitting a  
plurality of sets of the image data and a plurality of sets  
of the control information,  
and wherein the digital reception apparatus comprises:  
reception means for receiving the digital broadcast;  
extraction means for extracting one set of image data  
and a corresponding set of control information from the  
received digital broadcast;  
storage means for storing the extracted set of control  
information;  
reproduction means for reproducing the extracted set  
of image data;  
operation means for receiving a user selection  
operation of link destination information included in the

28 set of control information; and  
29 extraction control means for controlling the  
30 extraction means to extract a set of image data and a  
31 corresponding set of control information which are indicated  
32 by the link destination information selected by the user  
33 selection operation.

1 49., A digital broadcasting system, which achieves simulated  
2 interaction using a digital broadcast, including a digital  
3 broadcasting apparatus and a digital reception apparatus,  
4 wherein the digital broadcasting apparatus comprises:  
5 image information storage means for storing a  
6 plurality of sets of image data, each of which has an image  
7 data identifier;  
8 control information storage means for storing a  
9 plurality of sets of control information, each of which has  
10 a control information identifier, and each of which includes  
11 link destination information that shows a set of image data  
12 and a set of control information for a link destination for  
13 a corresponding set of image data, the link destination  
14 information being a combination of an image data identifier  
15 for the set of image data of the link destination and a  
16 control information identifier for the set of control  
17 information for the link destination;  
18 correspondence information storage means for storing  
19 correspondence information showing correspondence between

20 the sets of image data and the sets of control information;  
21 and  
22 multiplexing transmission means for reading a set of  
23 image data and a corresponding set of control information  
24 given in the correspondence information, and for repeatedly  
25 transmitting the read set of image data and the read set of  
26 control information as a multiplexed stream, having assigned  
27 image data identification information and written the image  
28 data identification information into the image data, and  
29 having assigned control information identification  
30 information and written the control information  
31 identification information into the control data,  
32 wherein the digital broadcast reception means  
33 comprises:  
34 reception means for receiving the digital broadcast;  
35 extraction means for extracting one set of image data  
36 and a corresponding set of control information from the  
37 received digital broadcast;  
38 storage means for storing the extracted set of control  
39 information;  
40 reproduction means for reproducing the extracted set  
41 of image data;  
42 operation means for receiving a user selection  
43 operation of link destination information included in the  
44 set of control information; and  
45 extraction control means for controlling the

46 extraction means to extract a set of image data and a  
47 corresponding set of control information which are indicated  
48 by the link destination information selected by the user  
49 selection operation.

1 50. A recording medium for use by a reception apparatus,  
2 the reception apparatus including: reception means which  
3 receives a repeatedly transmitted digital broadcast of a  
4 plurality of sets of image data and sets of control  
5 information which correspond to the sets of image data, each  
6 set of control information including link destination  
7 information showing a set of image data which is a link  
8 destination for a link attached to a set of image data  
9 corresponding to the set of control information; extraction  
10 means for extracting one set of image data and a  
11 corresponding set of control information from the received  
12 digital broadcast; storage means for storing the extracted  
13 set of control information; reproduction means for  
14 reproducing the extracted set of image data; operation means  
15 for receiving a user operation; and program execution means  
16 for executing a program recorded on the recording medium,  
17 the program including the following steps:  
18 a selection operation judgement step for judging a  
19 user selection operation for link destination information  
20 included in a set of control information; and  
21 an extraction control step for controlling the

- 22 extraction means to extract a set of image data and a  
23 corresponding set of control information indicated by link  
24 destination information selected by the user.